

Nebraska Tobacco Settlement
Biomedical Research
Development Fund

Fiscal Year
2014-2015

Progress Report

University of Nebraska Medical Center
University of Nebraska–Lincoln
Creighton University
Boys Town National Research Hospital

Nebraska Tobacco Settlement
Biomedical Research
Development Fund

Fiscal Year 2014-2015

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University of Nebraska–Lincoln
Creighton University
Boys Town National Research Hospital

Nebraska Tobacco Settlement
Biomedical Research
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Section I

Fund Allocation to Each Institution

University of Nebraska Medical Center

University of Nebraska–Lincoln

Creighton University

Boys Town National Research Hospital

University of Nebraska Medical Center
Nebraska Tobacco Settlement Biomedical Research Development Fund
FY 2014-2015 Allocation

Strategic Faculty Recruitment and Retention	FY 2014-2015 Allocation
College of Dentistry	\$ 120,042
Fahd Alsalleeh, PhD; Ali Nawshad, PhD; Aimin Peng, PhD	
College of Medicine	
Biochemistry/Molecular Biology	\$ 465,033
Surinder Batra, PhD; Justin Mott, MD; Melissa Teoh-Fitzgerald, PhD*	
Moorthy Palanimuthu Ponnusamy, PhD; Rebecca Oberley-Deegan, PhD*	
Cellular/Integrative Physiology	\$ 731
Matthew Zimmerman, PhD	
Genetics, Cell Biology & Anatomy	\$ 292,339
Vimla Band, PhD*; Chittibabu Guda, PhD; Kishor Bhakat, PhD	
Internal Medicine	\$ 31,236
Stephen Bonasera, MD, PhD; Duygu Dee Harrison-Findik, DVM, PhD*	
Pathology/Microbiology	\$ 383,762
Kenneth Bayles, PhD; Tammy Kielian, PhD*; Keer Sun, PhD*	
Pharmacology/Experimental Neuroscience	\$ 128,958
Shilpa Buch, PhD*; Howard Fox, MD, PhD	
Surgery	\$ 531,762
B Timothy Baxter, MD; Alexey Kamenskiy, PhD;	
Jason MacTaggart, MD; David Mercer, MD; Michael Moulton, MD;	
Iraklis Pipinos, MD; Nora Sarvetnick, PhD*	
College of Pharmacy	\$ 244,788
Jered Garrison, PhD; Ram Mahato, PhD; David Oupicky, PhD	
College of Public Health	\$ 78,875
Pinaki Panigrahi, MD; Amr Soliman, PhD	
Eppley Institute	\$ 1,764,324
Hamid Band, MD, PhD; Jennifer Black, PhD*; Michael Brattain, PhD;	
Ken Cowan, MD, PhD; Jixin Dong, PhD; Michael (Tony) Hollingsworth, PhD;	
Adam Karpf, PhD; Mayumi Naramura, MD*; Rene Opavsky, PhD;	
Amarnath Natarajan, PhD; Angie Rizzino, PhD	
Munroe Meyer Institute	\$ 45,071
Anna Dunaevsky, PhD*	
Subtotal	\$ 4,086,921
Research Program & Infrastructure Development	
Comparative Medicine Operations: Dixon	\$ 150,000
Comparative Medicine Animal Care Cost Support	\$ 250,000
Biosciences Research Training Program (B RTP)	\$ 60,000
IRB & SPAdmin- ITS Svc Level Agreements	\$ 216,820
Library - Scopus	\$ 27,820
Research Core Lab Support	\$ 1,278,174
Sax System Service	\$ 33,303
DRC Research Resource Support	\$ 74,362
Institutional Research Resource Support	\$ 318,557
IDeA Networks of Biomedical Research Excellence (INBRE) Scholars	\$ 73,200
Center for Clinical & Translational Research: Larsen	\$ 77,899
Editorial Office	\$ 78,359
Center for Cellular Signaling	\$ 72,531
Redox Biology Center	\$ 20,020
Central States Center for Agricultural Safety & Health (CS-Cash)	\$ 20,000
Subtotal	\$ 2,751,045
Research in Health Disparities	
Virginia-Nebraska Alliance	\$ 128,402
Center for Reducing Health Disparities	\$ 356,490
Pediatrics Recruitment: Stephen Obaro	\$ 75,000
Subtotal	\$ 559,892
Joint UNMC-UNL Research Programs	
Breast Cancer Stem Cell Regulation by ECM Mechanics: V. Band	\$ 37,500
Best Practices for Range Bison Herds	\$ 2,481
Novel Cecum Cannulated Human Gut Microbiota Associated Pig GI Model	\$ 50,000
Subtotal	\$ 89,981
Total FY 2014-15 Allocation	\$ 7,487,839

University of Nebraska-Lincoln
Nebraska Tobacco Settlement Biomedical Research Development Fund
FY 2014-2015 Allocation

<u>Strategic Faculty Recruitment and Retention</u>	<u>Allocation</u>
Eric Weaver, Ph.D., Biological Sciences	300,000
Matthew Johnson, Ph.D., Psychology	255,942
Limei Zhang, Ph.D., Biochemistry	214,000
Mike Dodd, Ph.D., Psychology	30,000
Jeffrey Price, Ph.D., Nebraska Center for Virology	25,000
Subtotal	\$ 824,942

<u>Research Program and Infrastructure Development</u>	
Social Behavioral Sciences Research Consortium, Dan Hoyt, Ph.D.	500,000
Molecular Mechanisms of Disease, Melanie Simpson, Ph.D.	387,687
Center for Brain, Biology and Behavior, Arthur Maerlender, Ph.D.	233,649
Faculty Development in Biomedical Sciences	99,479
Nebraska Center for Virology, John West, Ph.D.	75,965
Functional brain networks mediating a negativity bias in children, Mital Neta, Ph.D.	50,000
Mitochondrial dysfunction in neurological disorders and health span, Don Becker, Ph.D.	50,000
TLR and KSHV interactions in viral replication and transformation, Luwen Zhang, Ph.D.	50,000
Peritoneal Microbubble Oxygen Therapy for ARDS, Benjamin Terry, Ph.D.	50,000
Quantifying Biochemical Communication in Hepatocellular Carcinoma, Clifford Stains, Ph.D.	50,000
Gene-Environment Interactions in Neurodegeneration, Rodrigo Franco-Cruz, Ph.D.	50,000
Adipose Mechanobiology for Type 2 Diabetes, Jung Yul Lim, Ph.D.	50,000
Intervention to manage overweight and obesity for low income preschoolers, Brandy Clarke, Ph.D.	49,994
Center for Brain, Biology and Behavior, David Hansen, Ph.D.	40,713
Acquisition of a Seahorse XFe24 Extracellular Flux Analyzer, Don Becker, Ph.D.	32,000
Promoting Growth Plate Architecture in Alginate Hydrogel 3-D Matrices, Angela Pannier, Ph.D.	25,000
Interaction of Human Papilloma Pseudo Viruses with Fibrous Heparan Sulfate Surfaces, Gustavo Larsen, Ph.D. & Peter Angeletti, Ph.D.	25,000
Defining aberrant steroid elimination in castration resistant prostate cancer, Melanie Simpson, Ph.D.	25,000
Recognition and recruitment of viral RNA into RNA silencing pathways, Hernan Garcia-Ruiz, Ph.D.	23,150
Nebraska Center for Virology, Charles Wood, Ph.D.	20,000
Translating Big Data into Human Health through MicroRNA Biology, Janos Zempleni, Ph.D.	10,000
Neuro TelNet: Telecommunications and Computer Networking in Neuroscience, Massimiliano Pierobon, Ph.D.	10,000
Breast Cancer Stem Cell Regulation by ECM Mechanics, Sangjin Ryu, Ph.D.	6,250
Narrative Palliative Cancer Care: Improving Communication in Family Teams, Jody Koenig, Ph.D.	2,000
Subtotal	\$ 1,915,887

<u>Minority Health Research Grants</u>	
Minority Health Disparities Initiative, Rick Bevins, Ph.D.	113,540
Understanding How Stress Process Physiology Affects Health, Jacob Cheadle, Ph.D.	25,000
Stress Exposure, Sleep, and Minority Health Disparities, Tim Nelson, Ph.D.	24,998
Family Dynamics, Identity, and Psychological Well-being in Multiethnic-racial Individuals, Jordan Soliz, Ph.D.	22,870
Minority Health Disparities Initiative, Dan Hoyt, Ph.D.	19,891
Subtotal	\$ 206,299

Total FY 2014-2015 Allocation **\$ 2,947,128**

Creighton University
Nebraska Tobacco Settlement Biomedical Research Development Fund
FY 2014-2015 Allocation

Research Program & Infrastructure Development	Allocation	
MIRNA and RNAI Effects on Hair Cell Transdifferentiation by ATOH1	\$	75,000
Role of Autophagy Genes in Auditory Hair Cell Survival	\$	75,000
Role of FOXO1 in Vitamin D Deficiency-Induced Insulin Resistance	\$	60,000
Evaluation of Platelet Function and Arterial Stiffness with E-Cigarettes	\$	75,000
MIR-574-5P Balances the Neural Progenitor Sphingolipid-APP Axis of Good and Evil	\$	75,000
Vitamin D Endocrine System in Barrett's Esophageal Carcinogenesis	\$	60,000
Mechanisms Underlying Insulin Resistance in Morbidly Obese Patients	\$	60,000
Triggering Receptors Expressed on Myeloid Cells and Bladder Cancer	\$	60,000
Identification and Optimization of Novel Anti-Tuberculosis Agents	\$	70,608
Prion Disease Postdoctoral Support	\$	42,000
Neuropharmacology Postdoctoral Support	\$	48,391
Development and Biophysics of Cochlear Hair Cells Bridge Funding	\$	24,262
School of Medicine Research Faculty Bridge Support	\$	345,882
Illumina Miseq Next-Gen Sequencer	\$	123,831
Imagexpres Micro High Content Screening System	\$	149,301
Imaging Core Technician & Service Contract	\$	64,500
Histology Core Facility	\$	20,233
New Initiative Application Reviewer Services	\$	3,400
Research Compliance Regulatory Support	\$	57,049
University Biostatistician	\$	100,725
Subtotal	\$	1,590,182
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Minority Health Research Grants		
Center for Promoting Health and Health Equality	\$	193,913
Subtotal	\$	193,913
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Total FY 2014-15 Allocation	\$	1,784,095

Boys Town National Research Hospital
Nebraska Tobacco Settlement Biomedical Research Development Fund
FY 2014-2015 Allocation

	Allocation
<u>Strategic Faculty Recruitment and Retention</u>	
Sophie Ambrose, PhD, Lied Learning and Technology Center	68,510
Kayla Pope, MD, JD, Neurobehavioral Disorders	10,870
Monita Chatterjee, Ph.D, Lied Learning and Technology Center	138,525
Barbara Morley, PhD, Hearing Research	56,253
Shuman He, PhD, Hearing Research	2,760
Richard Tempero, MD, PhD, Otolaryngology	22,434
Edward Walsh, PhD, Hearing Research	92,846
Yunxia Lundberg, PhD, Usher Syndrome Center	73,437
Marissa Zallocchi, PhD, Usher Syndrome Center	184,439
Subtotal	\$ 650,074
 <u>Research Program and Infrastructure Development</u>	
Animal Care Facility Core, JoAnn McGee, PhD	48,855
Electron Microscopy Core, Walt Jesteadt, PhD	7,860
Usher Syndrome Center Core Support, Dominic Cosgrove, PhD	317,857
New Projects Fund, Michael Gorga, PhD	6,395
Recruitment Fund, Walt Jesteadt, PhD	6,996
Postdoctoral Training, Walt Jesteadt, PhD	9,927
Subtotal	\$ 397,890
 <u>Minority Health Research Grants</u>	
Minority Recruitment, Michael Gorga, PhD	16,593
Spanish-English Bilinguals, Kanae Nishi, PhD	55,919
Subtotal	\$ 72,512
Total FY 2014-2015 Allocation	\$ 1,120,475.39

Nebraska Tobacco Settlement
Biomedical Research
Development Fund

Section II

Project Progress Descriptions

University of Nebraska Medical Center
University of Nebraska–Lincoln
Creighton University
Boys Town National Research Hospital

UNIVERSITY OF NEBRASKA MEDICAL CENTER
Nebraska Tobacco Settlement Biomedical
Research Development Fund (NTSBRDF)

Year 14: July 1, 2014-June 30, 2015
Progress Report

Executive Summary

UNMC invests NTSBRDF dollars in four areas:

- Recruitment and retention of excellent scientists
- Research infrastructure and program development
- Joint University research programs
- Research and education programs focused on improving health and reducing health disparities

During 2014-15, UNMC received \$7,487,839 in Nebraska Tobacco Settlement Funds. It was invested as follows:

- \$4,086,921 in strategic recruitment and retention of researchers of merit, including \$1,246,526 for the recruitment or retention of women or under-represented minorities.
- \$2,751,045 in infrastructure development, including equipment, cores, and Centers
- \$89,981 in University of Nebraska joint research programs;
- \$559,892 in research projects directed at health care disparities or fostering partnerships, recruitment, mentoring, of trainees and faculty of under-represented minority or disadvantaged groups.

Overall, 24.1% of the total 2014-2015 award was focused on the recruitment of under-represented minorities or research focused on health disparities.

Since the activation of the NTSBRDF program at the beginning of fiscal year 2001-02, these funds have been critical to the recruitment and/or retention of many of our world-class scientists who contribute to our growing research funding portfolio.

Last year UNMC research funding totaled \$93.3 M, which was an increase of 13% in NIH and 4.0% in total research awards from the previous year. Overall, UNMC's total extramural support for research has increased 129% since the availability of the NTSBRDF. The growth of research funding from outside the state, in turn, has a direct and positive impact on the economy of the State of Nebraska by creating new jobs, both directly by new faculty hires and staff recruitment and indirectly through purchases made with grant monies.

Since 2001, when NTSBRDF support began, UNMC has invested approximately \$55.9M in the strategic recruitment or retention of 174 researchers, which, in turn, have attracted a total of over \$755.8M in extramural research support after receiving NTSBRDF funding. As a result, this program has resulted in a return on investment of approximately 13.5 to 1.

Strategic Faculty Recruitment and Retention

In 2014-2015, UNMC invested the majority of its NTSBRDF, \$4,086,921 (54.6%), in strategic recruitment and retention. These NTSBRDF dollars were well-invested as the researchers who received them have a combined total extramurally funded research portfolio valued at \$146.6M. These investigators were predominantly funded from the National Institutes of Health (NIH), including National Cancer Institute (NCI), National Heart, Lung, Blood Institute (NHLBI), National Institute on Aging (NIA), National Institute of Allergy & Infectious Diseases (NIAID), National Institute of Biomedical Imaging and Bioengineering (NIBIB), Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institute on Drug Abuse (NIDA), National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK), National Institute of General Medical Sciences (NIGMS), National Institute of Mental Health (NIMH), and National Institute of Neurological Disorders and Stroke (NINDS). Other federal funding sources included the National Science Foundation (NSF) and the United States Army (US Army).

Newly Awarded Investigators (First Time NTSBRDF support during 2014-2015)

Investigator: Jennifer Black, PhD

Position Title & Department: Professor, Fred & Pamela Buffett Cancer Center, COM Genetics, Cell Biology & Anatomy

Expertise: Colon Cancer, Endometrial Cancer, Cellular Signaling

External Funding:

Current Funding Total: \$2,363,742

Funding sources: DHHS/NIH/NCI/NIDDK

Investigator: Kishor Bhakat, PhD

Position Title & Department: Associate Professor, COM, Genetics, Cell Biology and Anatomy

Expertise: Epigenetic Diagnostic/Prognostic Biomarkers for Cancer

External Funding:

Current Funding Total: \$941,513

Funding sources: DHHS/NIH/NCI

Investigator: Rebecca Oberley-Deegan, PhD

Position Title & Department: Assistant Professor, COM, Biochemistry and Molecular Biology

Expertise: Antioxidant & Free Radical Protection during Radiation Therapy

External Funding:

Current Funding Total: \$1,593,280

Funding sources: DHHS/NIH/NCI

Investigator: Adam Karpf, PhD

Position Title & Department: Associate Professor, Fred & Pamela Buffett Cancer Center

Expertise: DNA Methylation Changes in Ovarian Cancer

External Funding:

Current Funding Total: pending

Funding sources: US Army

Investigator: David Oupicky, PhD

Position Title & Department: Parke-Davis Professor, COP, Pharmaceutical Sciences, and Co-Director, Center for Drug Delivery & Nanomedicine

Expertise: Polymers & Nanoparticules for Delivery of Drugs & Genes

External Funding:

Current Funding Total: \$2,255,542

Funding sources: DHHS/NIH/NBIB, NE DHHS/LB506

Investigator: Moorthy Palanimuthu Ponnusamy, PhD

Position Title & Department: Assistant Professor, COM, Biochemistry and Molecular Biology

Expertise: Biochemical & Molecular Studies of MUC4 in Ovarian Cancer

External Funding:

Current Funding Total: \$364,434

Funding sources: DHHS/NIH/NCI

Investigator: Keer Sun, PhD

Position Title & Department: Assistant Professor, COM, Pathology/Microbiology

Expertise: Immunology, Virus-Host-Bacterium Interactions

External Funding:

Current Funding Total: \$1,463,209

Funding sources: DHHS/NIH/NHLBI

Investigator: Melissa Teoh-Fitzgerald, PhD

Position Title & Department: Assistant Professor, COM, Biochemistry and Molecular Biology

Expertise: Oxidative Tumor Microenvironments

External Funding:

Current Funding Total: \$1,553,476

Funding sources: DHHS/NIH/NCI

Mentored Faculty Programs for Under-Represented Minority and Other Junior Investigators

Investigator: Fahd Alsalleeh, PhD

Position Title & Department: Assistant Professor, COD, Surgical Specialties

Expertise: Immunomodulation and Response of the Host Defenses during Fungal Infection

Investigator: Jason N. MacTaggart, MD

Position Title & Department: Assistant Professor, COM, Surgery - General

Expertise: Endovascular Repair and Pathophysiology of Aortic Aneurysm and Dissection

Investigator: Mayumi Naramura, MD

Position Title & Department: Assistant Professor, Fred & Pamela Buffett Cancer Center

Expertise: Biochemical Pathways Controlling Cancer Stem Cells

Investments in Critical Infrastructure Faculty or Strategic Pilot Grants to Incentivize New Research Collaborations

Investigator: Michael Boska, PhD

Position Title & Department: Vice Chairman, Radiology Research, Professor, COM, Radiology, & Director Bioimaging Core Facility
Expertise: Magnetic Resonance Imaging (MRI) & Spectroscopy (MRS) Methods
Strategic Focus: Bioimaging Core

Investigator: Ken Cowan, MD, PhD
Position Title & Department: Director & Professor, Fred & Pamela Buffett Cancer Center
Expertise: Breast Cancer
Strategic Focus: Cancer Center

Investigator: Chittibabu Guda, PhD
Position Title & Department: Associate Professor, COM, Genetics, Cell Biology and Anatomy & Director Bioinformatics & Systems Biology Core Facility
Expertise: Bioinformatics
Strategic Focus: Bioinformatics Core

Investigator: David W. Mercer, MD
Position Title & Department: Chairperson & Professor, COM, Surgery
Expertise: Role of Gut in Pathogenesis of Multiple Organ Failure
Strategic Focus: Surgical Specialities Recruitment

Funded Investigators (Received Continuing NTSBRDF support during 2014-2015)

Investigator: Hamid Band, MD, PhD
Position Title & Department: Professor, Fred & Pamela Buffett Cancer Center
Expertise: Cellular Signaling in Cancer, Breast Cancer
External Funding:
Current Funding Total: \$2,833,885
Funding sources: DHHS/NIH/NCI

Investigator: Vimla Band, PhD
Position Title & Department: Chairperson & Professor, COM, Genetics, Cell Biology and Anatomy
Expertise: Cancer, Diagnostic/Prognostic Markers for Breast Cancer
External Funding:
Current Funding Total: \$2,179,809
Funding sources: DHHS/NIH/NCI, US Army

Investigator: Surinder Batra, PhD
Position Title & Department: Chairperson & Professor, COM, Biochemistry and Molecular Biology
Expertise: Pancreatic Cancer, Development of Diagnostic/Prognostic Markers for Cancer
External Funding:
Current Funding Total: \$11,441,171
Funding sources: DHHS/NIH/NCI, University of Nebraska-Lincoln

Investigator: Bernard Timothy Baxter, MD
Position Title & Department: Professor, COM, Surgery - General
Expertise: Aortic Aneurysms, Causes and Treatments for Aneurysms; Surgical Interventions

External Funding:

Current Funding Total: \$5,281,134

Funding sources: DHHS/NIH/NHLBI, University of Maryland

Investigator: Kenneth Bayles, PhD

Position Title & Department: Associate Vice Chancellor for Basic Science & Professor, COM, Pathology/Microbiology

Expertise: Antibiotic Development for Resistant Staphylococcal Disease

External Funding:

Current Funding Total: \$10,635,782

Funding sources: DHHS/NIH/NIAID, National Strategic Research Institute

Investigator: Stephen J Bonasera, MD, PhD

Position Title & Department: Assistant Professor, COM, Internal Medicine - Geriatrics

Expertise: Neurobiology of Aging

Current Funding Total: \$916,391

Funding sources: University of California – San Francisco

Investigator: Michael Brattain, PhD

Position Title & Department: Professor & Associate Director, Fred & Pamela Buffett Cancer Center

Expertise: Colon Cancer, Molecular Targeting in Cancer

External Funding:

Current Funding Total: \$2,776,874

Funding sources: DHHS/NIH/NCI

Investigator: Shilpa Buch, PhD

Position Title & Department: Professor, COM, Pharmacology & Experimental Neurosciences

Expertise: Infectious Diseases of the Brain and their Treatment

External Funding:

Current Funding Total: \$10,748,009

Funding sources: DHHS/NIH/NIDA/NIMH, Lovelace Respiratory Research Institute, IQ Solutions

Investigator: Jixin Dong, PhD

Position Title & Department: Assistant Professor, Fred & Pamela Buffett Cancer Center

Expertise: Cancer Cell Growth

External Funding:

Current Funding Total: \$1,770,625

Funding sources: DHHS/NIH/NIGMS, US Army

Investigator: Anna Dunaevsky, PhD

Position Title & Department: Associate Professor, MMI, Neurodevelopmental Neuroscience

Expertise: Neurodevelopmental Disorders and Learning Induced Changes in the Brain

External Funding:

Current Funding Total: \$4,001,507

Funding sources: DHHS/NIH/NICHD/NIMH, US Army

Investigator: Howard Fox, MD, PhD

Position Title & Department: Senior Associate Dean for Research & Professor, COM, Pharmacology & Experimental Neurosciences

Expertise: Infectious and Neurodegenerative Diseases and Substance Abuse

External Funding:

Current Funding Total: \$21,347,225

Funding sources: DHHS/NIH/NIMH/NIDA

Investigator: Jered Garrison, PhD

Position Title & Department: Assistant Professor, COP, Pharmaceutical Science

Expertise: Drug Development, Nanomedicine and Molecular Targeting

External Funding:

Current Funding Total: \$1,561,440

Funding sources: DHHS/NIH/NCI

Investigator: Michael A. (Tony) Hollingsworth, PhD

Position Title & Department: Professor, Fred & Pamela Buffett Cancer Center

Expertise: Pancreatic Cancer

External Funding:

Current Funding Total: \$14,195,436

Funding sources: DHHS/NIH/NCI, GlycoMimetics Inc., Quest Pharma Tech Inc.

Investigator: Alexey Kamenskiy, PhD

Position Title & Department: Assistant Professor, COM, Surgery - General

Expertise: Material Science, Protein Misfolding and Protein Interactions, Therapeutic and Early Diagnostic Materials Development

Current Funding Total: \$3,567,176

Funding sources: DHHS/NIH/NHLBI

Investigator: Tammy Kielian, PhD

Position Title & Department: Professor, COM, Pathology/Microbiology

Expertise: Juvenile Batten Disease, Translational Therapeutics, Neuroimmunology and Infectious Disease

External Funding:

Current Funding Total: \$2,063,255

Funding sources: DHHS/NIH/NINDS, Batten Disease Support & Research Association, Abeona Therapeutics Inc., Pfizer Inc.

Investigator: Ram Mahato, PhD

Position Title & Department: Chairperson & Professor, COP, Pharmaceutical Science

Expertise: Genetic Therapies, Drug Delivery Systems

External Funding:

Current Funding Total: \$3,798,237

Funding sources: DHHS/NIH/NIBIB/NIGMS, US Army, National Science Foundation, University of Tennessee Health Science Center, University of Nebraska Foundation

Investigator: Justin Mott, MD, PhD

Position Title & Department: Assistant Professor, COM, Biochemistry and Molecular Biology

Expertise: Cell Death in Liver Cancer, MicroRNA Expression & Function

External Funding:

Current Funding Total: \$501,500

Funding sources: NE DHHS/LB506, University of Nebraska - Lincoln

Investigator: Michael J. Moulton, MD

Position Title & Department: Professor, COM, Surgery - Cardiovascular & Thoracic

Expertise: Mitral Valve Repair, Aortic Surgery, Heart Transplantation, Surgical Treatment of Heart Failure

External Funding:

Current Funding Total: \$825,417

Funding sources: AbbVie Inc., Avinger Inc., Grifols Inc.

Investigator: Amaranath Natarajan, PhD

Position Title & Department: Professor, Fred & Pamela Buffett Cancer Center

Expertise: Small Molecule Probes, Cancer Therapeutics

External Funding:

Current Funding Total: \$439,914

Funding sources: DHHS/NIH/NCI

Investigator: Ali Nawshad, MDSc, PhD

Position Title & Department: Associate Professor, COD, Oral Biology

Expertise: Cellular Signaling During Palate Development

External Funding:

Current Funding Total: \$255,636

Funding sources: University of Michigan, Texas A&M University

Investigator: Stephen K Obaro, MBBS, PhD

Position Title & Department: Professor & Director, Pediatric International Research, COM, Pediatrics Infectious Disease

Expertise: Health Disparities, Infectious Disease

External Funding:

Current Funding Total: \$1,902,859

Funding sources: DHHS/NIH/NIAID, GlaxoSmithKline

Investigator: Rene Opavsky, PhD

Position Title & Department: Assistant Professor, Fred & Pamela Buffett Cancer Center

Expertise: Epigenetics, Lymphoma Causes, DNA Methylation

External Funding:

Current Funding Total: \$1,721,345

Funding sources: DHHS/NIH/NCI

Investigator: Pinaki Panigrahi, MD

Position Title & Department: Professor & Director, Center for Global Health & Development, & Professor, COPH, Epidemiology

Expertise: Pathogenesis of Infectious & Inflammatory Diseases of the Gastrointestinal Tract

External Funding:

Current Funding Total: \$941,815

Funding sources: Univeristy of Nebraska - Lincoln, Child Health Research Foundation, Nestec Ltd.

Investigator: Aimin Peng, PhD

Position Title & Department: Associate Professor, COD, Oral Biology

Expertise: Cell Cycle Regulation & DNA Damage Response in Human Cancers

External Funding:

Current Funding Total: \$1,561,603

Funding sources: DHHS/NIH/NCI

Investigator: Iraklis Pipinos, MD

Position Title & Department: Professor, COM, Surgery - General

Expertise: Regenerative Medicine, Peripheral Arterial Disease, Repair of Skeletal Muscle Tissue in the Extremities

External Funding:

Current Funding Total: \$9,933,930

Funding sources: DHHS/NIH/NIA

Investigator: Angie Rizzino, PhD

Position Title & Department: Professor, Fred & Pamela Buffett Cancer Center

Expertise: Molecular Mechanisms Controlling Tumor-Initiating Cells

External Funding:

Current Funding Total: \$137,400

Funding sources: NE DHHS/LB506/LB606

Investigator: Nora Sarvetnick, PhD

Position Title & Department: Director, Nebraska Regenerative Medicine Project, & Professor, COM, Surgery

Expertise: Regenerative Medicine, Regulation of the Immune Response, Immunological Implications of Diabetes, Immunology of Autoimmune Diseases

External Funding:

Current Funding Total: \$4,224,650

Funding sources: DHHS/NIH/NIAID, Benaroya Research Institute at Virginia Mason, University of Miami, Univeristy of Nebraska Foundation, GlaxoSmithKline Research & Development Limited

Investigator: Amr S. Soliman, MD, MPH, PhD

Position Title & Department: Professor, COPH, Epidemiology

Expertise: Cancer Epidemiology, Underserved and Minority Population Cancer Epidemiology, Migration Studies

External Funding:

Current Funding Total: \$1,267,211

Funding sources: DHHS/NIH/NCI

Investigator: Matthew C. Zimmerman, PhD

Position Title & Department: Associate Professor, COM, Cellular & Integrative Physiology

Expertise: Hypertension, Neuronal-derived Reactive Oxygen Species (ROS)

External Funding:

Current Funding Total: \$2,262,698

Funding sources: DHHS/NIH/NHLBI, University of Nebraska - Lincoln, American Heart Association - Midwest Affiliates

Research Program and Infrastructure Development

A total of \$2,751,045 (37%) was invested in research program and infrastructure development in 2014-2015. The general areas included animal facilities support, research core laboratories, grant management, and educational/training & compliance programs for NIH-funded scientists. Infrastructure is often critical to attract and retain nationally recognized scientists. These investments in infrastructure support investigators with research awards of over \$93.3M annually.

Examples of infrastructure supported by these funds include the Comparative Medicine department, which was awarded \$400,000 or 15% of the infrastructure total, for animal facility equipment and program development which benefits many researchers. Support for core facilities such as the Bioimaging Core which provides cutting edge imaging technology critical to the study of traumatic brain injuries and neurodegenerative diseases such as Parkinson's and Alzheimer's, is critical to the success of our NIH funded programs the Nebraska Center for Nanomedicine, the Center for Neurodegenerative Disorders, and the Center for Integrative & Translational Neuroscience.

NTSBRDF support has also supported new software development and implementation to facilitate access of our scientists to management, informatics, educational, and other software applications to increase research efficiency and decrease the risk of non-compliance.

Minority Health and Health Disparities Research and Mentor Programs

In 2014-15, UNMC invested \$559,892 in health disparities by supporting UNMC's Center for Reducing Health Disparities (CRHD), supporting collaborations with the Virginia-Nebraska Alliance and the recruitment of an infectious disease specialist who works to reduce health disparities through the improved diagnosis, and treatment of infections that impact children.

The mission of the CRHD is to promote health equity and social justice in health and health care by leading collaborative efforts to generate and disseminate evidence-based, policy-relevant solutions. The vision of the CRHD is to become a nationally recognized Center of Excellence for promoting health equity through quality research, education, and community engagement. One of the priorities identified in the vision statement and strategic plan is to improve research capacity and performance in the areas of cancer-related health disparities, obesity and diabetes, rural health, and maternal and child health in an effort to become more competitive in initiating and sustaining sponsored programs in these areas. Six major research projects were supported in part through NTSBRDF in the focus areas ("Cardiovascular Disease Prevention Among Native Americans in Thurston County, Nebraska"; "Healthy Neighborhood Store Evaluation Project"; "Migrant Farmworker Health Study"; "UCSF/UNMC Collaboration on Family Planning Availability in the Midwest", "Winnebago Tribal Health Department (Maternal & Child Health Program Assessment)", and "Youth Violence Must Stop in Omaha") An investment of \$356,490 was made in the Center for Reducing Health Disparities.

The Virginia-Nebraska Alliance (The Alliance) is a unique partnership between unlikely partners to address the national need to diversify the healthcare and biomedical research workforce. The Alliance

was formed in September 2004 between two of Virginia's Historically Black Colleges/ Universities (HBCUs)—J. Sargeant Reynolds Community College and Virginia Commonwealth University (VCU)—and UNMC. In 2006 the University of Richmond (U of R), the University of Virginia (UVA), and Eastern Virginia Medical School (EVMS) joined so the Alliance now includes five HBCUs. The Alliance focuses on four areas: 1) student exchanges to identify and encourage undergraduate students interested in health professions or health research graduate education to pursue their goal and consider attending programs at UNMC; 2) faculty exchanges; 3) faculty research collaborations; and 4) institutional collaborations to pursue new funding opportunities. Participating students conduct research with mentors for two summers. Faculty exchanges include collaborative research, seminars and presentations. Virginia HBCUs attract a majority of underrepresented minority students and provide a pipeline to graduate training programs as they are largely focused on undergraduate education. UNMC, in turn, views the relationship as an opportunity to attract more diverse students into its health professions and graduate education programs. Students become members of actively funded UNMC research teams for 10 weeks each summer during which they develop technical laboratory skills, expand their scientific knowledge base, analyze data, document results, participate in team meetings, attend research weekly seminars, and then present their work at the end of summer research poster session with all the other summer undergraduate students. They learn about career paths, interviewing skills, balancing the stresses of graduate training and personal life, and visit with successful role models. This year faculty from UNMC are working on a collaborative research project with faculty at HBCU Hampton University in the area of nanomedicine. A total of \$128,402 was invested in this program.

UNIVERSITY OF NEBRASKA–LINCOLN
Nebraska Tobacco Settlement
Biomedical Research Development Fund (NTSBRDF)

Year 14: July 1, 2014 - June 30, 2015
Progress Report

Executive Summary

Fourteen years of NTSBRDF funding have enabled the University of Nebraska–Lincoln to strategically invest funds to achieve tangible results and build significant biomedical research capacity to meet the needs of the State of Nebraska and the nation. UNL’s goals for the NTSBRDF program are to increase our biomedical research capacity and external funding, which in turn will enable us to contribute to the improved health of Nebraskans and stimulate economic development and employment opportunities in the state.

UNL has invested the NTSBRDF funds in three main areas:

- **Recruitment and retention of biomedical research faculty**, whose work aligns with our strategic priorities and who either bring significant funding with them or have a high likelihood of achieving relatively quick success in obtaining funding. This investment in faculty is one of the most effective means of increasing our research capacity and often has the most immediate return.
- **Development of new research projects or infrastructure** leading to funding from the National Institutes and other funding agencies. These grants are focused on major interdisciplinary research programs aligned with UNL’s research priorities and those of the funding agencies. They also include investments in programs to develop collaborative projects with UNMC.
- Research projects that specifically address issues of importance to the health of Nebraska’s **minority populations**.

In 2014-2015, UNL invested a total \$2,947,128 from the NTSBRDF program. These included an allocation of \$824,942 for four recruitments and one faculty retention; \$1,915,887 supporting research program and infrastructure development; and \$206,299, or 7 percent of the total, for minority health outreach, targeted capacity building, and research projects.

As in the previous thirteen years of the NTSBRDF program, we are seeing impressive results from these investments in people and research projects. The investments in retention offers and new faculty start-up packages have already resulted in submitted proposals for \$14,862,139 in external funding. This is excellent performance for a group consisting predominantly of new assistant professors. NTSBRDF funds also have been invested in cutting edge equipment and facilities to replace aging equipment and enhance our capacity to leverage extramural funding.

Strategic Faculty Recruitment and Retention

Introduction: Strategic recruitment and retention grants at UNL have two goals: to expand faculty expertise in important areas of biomedical research and to increase the base of NIH and other extramural funding. NTSBRDF funding allowed UNL to meet both of these goals. In 2014-2015, NTSBRDF funding partially supported the hiring of four new faculty members and the retention of one faculty member. The new and retained faculty members provide expertise in a wide variety of areas, including: virology, microbiology, immunology, cognitive and affective neuroscience, redox sensing, autoimmune disorders, and human cognition. This year UNL focused on hiring predominantly new assistant professors in these areas. The investments in retention offers and new faculty start-up packages have already resulted in submitted proposals for \$14,862,139 in external funding.

Faculty Recruitment

Investigator: Eric Weaver, Ph.D.

Position Titles & Department: Assistant Professor, School of Biological Sciences

Expertise: Virology, microbiology, immunology

External Funding:

Current Funding Total: \$0

Proposals Currently Pending: \$670,005

Funding Sources: DHHS-NIH, National Pork Board

Investigator: Matthew Johnson, Ph.D.

Position Titles & Department: Assistant Professor, Department of Psychology and the Center for Brain Biology and Behavior

Expertise: Cognitive mechanisms - Interactions between perception and reflection

External Funding:

Current Funding Total: \$0

Proposals Currently Pending: \$606,637

Funding Sources: DHHS-NIH, NSF-EPSCoR

Investigator: Limei Zhang, Ph.D.

Position Titles & Department: Assistant Professor, Department of Biochemistry

Expertise: Metallomolecules involved in redox sensing, metal homeostasis and detoxification

External Funding:

Current Funding Total: \$0

Proposals Currently Pending: \$0

Investigator: Jeffrey Price, Ph.D.

Position Title & Department: Research Assistant Professor, Nebraska Center for Virology

Expertise: autoimmune disorders, immunology

External Funding:

Current Funding Total: \$0

Proposals Currently Pending: \$2,841,363

Funding Sources: DHHS-NIH

Faculty Retention

Investigator: Michael Dodd, Ph.D.

Position Titles & Department: Associate Professor, Department of Psychology and the Center for Brain, Biology and Behavior

Expertise: Human cognition – visual attention memory

External Funding:

Current Funding Total: \$439,279

Proposals Currently Pending: \$10,564,314

Funding Sources: DHHS-NIAAA, DHHS-National Eye Institute

Research Program and Infrastructure Development

A total of \$1,915,887 was invested in supporting research program and infrastructure development in 2014-2015. These investments will enhance the ability of UNL faculty to compete for external biomedical research funding. In fact these investments have already been directly leveraged to secure more than \$2.5M in new external funding during 2014-2015, with total NIH expenditures exceeding \$14M. The general areas include support for development of novel research programs with the potential to improve human health and to enhance the research infrastructure at UNL. In addition, investments were made in equipment needed to conduct the research at several campus facilities and grant development support. The research projects funded in 2014-2015 cover important areas of health research, including molecular mechanisms of disease, neurological disorders, breast cancer, prostate cancer, obesity, developmental changes in the brain, language, and cognitive processes across the lifespan, brain injury, and tissue engineering. In 2014-2015, funding was also provided to partially support the acquisition of specialized equipment to analyze major energy producing pathways of a cell in real-time. Several of these projects include collaborators across institutions in Nebraska, evidence of the success of our efforts to promote more collaboration between the institutions.

Project Title: Social and Behavioral Sciences Research Consortium

Principal Investigator: Dan Hoyt, Ph.D.

Description: The Social & Behavioral Sciences Research Consortium (SBSRC) facilitates the growth and excellence of Social & Behavioral Sciences research. Investments were made to support to build a referral network for existing resources, enhance capacity, and provide research seed funding for new investigators.

Project Title: Molecular Mechanisms of Disease

Principal Investigators: Melanie Simpson, Ph.D.

Description: This program develops outstanding new scientists who work in collaborative multi-disciplinary teams to research disease mechanisms using quantitative approaches that ultimately yield tangible strategies for prevention and therapy. Research in the program is broadly focused on defining components of disease progression at the level of molecular interactions and chemical transformations.

Project Title: Center for Brain, Biology, and Behavior

Principal Investigators:

David Hansen, Ph.D.

Arthur Maerlender, Ph.D.

Description: The Center for Brain, Biology and Behavior (CB3) is an interdisciplinary research center established to investigate the social, biological, behavioral, engineering and neurological issues related to human performance and development. Investments were made to support research evaluating concussions and their impact.

Project Title: Faculty Development in Biomedical Sciences

Description: A nationally known grant writing consultant provided workshops to UNL faculty to enhance competitiveness for federal funding.

Project Title: Nebraska Center for Virology

Principal Investigator:

Charles Wood, Ph.D.

John West, Ph.D.

Description: The Nebraska Center for Virology (NCV) conducts innovative interdisciplinary research addressing fundamental questions about infectious agents and the host responses that may lead to pathological changes. Investments were made to support research investigating fundamental processes that will enable the design of novel vaccines and therapeutic strategies to block disease.

Project Title: Functional brain networks mediating a negativity bias in children

Principal Investigator: Maital Neta, Ph.D.

Description: Seed funding was provided to characterize the relationship between regulatory brain networks and individual differences in valence bias in children. Task-based fMRI data assessing amygdala reactivity will be used to identify alternative sources of the valence bias in the brain.

Project Title: Mitochondrial dysfunction in neurological disorders and health span

Principal Investigator: Donald Becker, Ph.D.

Description: Seed funding was provided to characterize aspects of mitochondrial function that are important for redox homeostasis, heme, unfolded protein response, and proline metabolism, all of which are involved in human disease.

Project Title: TLR and KSHV interactions in viral replication and transformation

Principal Investigator: Luwen Zhang, Ph.D.

Description: Seed funding was provided to illuminate novel mechanisms within a host's toll-like receptors (TLR) system and Kaposi's sarcoma (KS)-associated herpes virus (KSHV) during viral disease development. Understanding the mechanisms of the host immune response against KSHV infections and the strategies employed by KSHV to escape this response is crucial for designing new therapies for the treatment of KSHV-associated diseases.

Project Title: Peritoneal Microbubble Oxygen Therapy for ARDS

Principal Investigator: Benjamin Terry, Ph.D.

Description: Seed funding was provided to investigate a novel peritoneal microbubble oxygen (PMO) therapy for acute respiratory distress syndrome (ARDS) arising from trauma, pneumonia, or other diseases.

Project Title: Quantifying Biochemical Communication in Hepatocellular Carcinoma

Principal Investigator: Clifford Stains, Ph.D.

Description: Seed funding was provided to delineate the molecular mechanisms responsible for the development of non-alcoholic fatty liver disease (NAFLD) and progression to hepatocellular carcinoma (HCC).

Project Title: Gene-Environment Interactions in Neurodegeneration

Principal Investigator: Rodrigo Franco-Cruz, Ph.D.

Description: Seed funding was provided to investigate the role of energy metabolism in: (i) oxidative stress; (ii) dysfunction of protein degradation pathways; and (iii) dopaminergic cell death induced by gene-environment interactions.

Project Title: Adipose Mechanobiology for Type 2 Diabetes

Principal Investigator: Jung Yul Lim, Ph.D.

Description: Seed funding was provided to gain insights into how mechanical signals regulate mesenchymal stem cells (MSC) adipogenesis for potential therapeutic attempts targeting molecular mechanosensors and to determine the role of adipose mechanotransduction in regulating insulin resistance for dealing with type 2 diabetes.

Project Title: Intervention to manage overweight and obesity for low-income preschoolers

Principal Investigator: Brandy Clarke, Ph.D.

Description: Seed funding was provided to collect pilot data to evaluate the potential efficacy, acceptability, and feasibility of a cross-system (i.e., conjoint behavioral consultation) approach to early childhood obesity and overweight with low-income preschoolers.

Project Title: Acquisition of a Seahorse XFe24 Extracellular Flux Analyzer

Principal Investigator: Donald Becker, Ph.D.

Description: Funding was provided to purchase a Seahorse XFe24 Extracellular Flux Analyzer, which determines in vitro oxygen consumption rate (OCR) and extracellular acidification rate (ECAR) to assess cellular functions, such as oxidative phosphorylation, glycolysis, and fatty acid oxidation.

Project Title: Promoting Growth Plate Architecture in Alginate Hydrogel 3-D Matrices

Principal Investigator: Angela Pannier, Ph.D.

Description: Seed funding was provided to investigate the effects of hydrogel biomechanical properties and integrated extracellular matrix factors on growth plate chondrocytes in vitro and then examine the effect of mechanical and chemical gradients on column formation in growth plate chondrocytes in vitro. This was a joint project with Andrew Dudley, Ph.D. (UNMC).

Project Title: Interaction of Human Papilloma Pseudo Viruses with Fibrous Heparan Sulfate Surfaces

Principal Investigators: Gustavo Larsen, Ph.D. & Peter Angeletti, Ph.D.

Description: Seed funding was provided to investigate the design of a fibrous material with very high affinity and capture potential for human papillomavirus (HPV). The long-term objective of the research project is to develop a nanofiber based heparan sulfate (HS)-poly (ϵ -caprolactone) (PCL) disposable patch or tampon component as a potential approach to diminish the risk of cell infection with HPV of the outermost layers of mucosal surfaces.

Project Title: Defining aberrant steroid elimination in castration resistant prostate cancer

Principal Investigators: Melanie Simpson, Ph.D.

Description: Seed funding was provided to investigate how precursors related to the cellular mechanisms controlling androgen elimination in prostate cells can be selectively partitioned to optimize androgen elimination during treatment and prevent castration resistant prostate cancer (CRPC).

Project Title: Recognition and recruitment of viral RNA into RNA silencing pathways

Principal Investigators: Hernan Garcia-Ruiz, Ph.D.

Description: Seed funding was provided to investigate viral components that activate RNA silencing, determine the viral targets of RNA silencing, and determine the mechanism of RDR1-dependent antiviral RNA silencing amplification.

Project Title: Translating Big Data into Human Health through MicroRNA Biology

Principal Investigators: Janos Zempleni, Ph.D.

Description: Seed funding was provided to begin the integration of bioinformatics and laboratory approaches to discover health-promoting effects of dietary microRNAs.

Project Title: Neuro TelNet: Telecommunications and Computer Networking in Neuroscience

Principal Investigators: Massimiliano Pierobon, Ph.D.

Description: Seed funding was provided to conduct a preliminary investigation on the application of telecommunications and computer network tools to the model of information flow within the nervous system, with particular focus on the human brain activity.

Project Title: Breast Cancer Stem Cell Regulation by ECM Mechanics

Principal Investigator: Sangjin Ryu, Ph.D.

Description: Seed funding was provided to conduct a preliminary investigation to assess the impact of changing mechanical properties of the extracellular matrix (ECM) on self-renewal of mammary stem/progenitors and to propel oncogenically-transformed mammary stem/progenitor cells along luminal or basal-like lineages using marker and molecular profiling analyses. This was a joint project with UNMC faculty members Vimla Band, Ph.D. and Hamid Band, MD, Ph.D.

Project Title: Narrative Palliative Cancer Care: Improving Communication in Family Teams

Principal Investigator: Jody Koenig Kellas, Ph.D.

Description: Seed funding was provided to conduct pilot interviews with palliative care cancer patients, physicians, and family caregivers to help enhance intervention techniques.

Minority Health Research Grants

Introduction: A total of \$206,299, or 7 percent of the total, was invested in five projects to address the health needs of racial and ethnic minorities. UNL is supporting the campus-wide Minority Health Disparities Research Initiative, which focuses on advancing science, policy, data integration, practice and training related to research on minority health disparity issues in Nebraska and the nation. Its ultimate goal is to reduce and eventually eliminate race- and ethnicity-based health disparities in Nebraska and beyond the state. The following projects, including the overall initiative, were funded in 2015.

Project Title: Minority Health Disparities Research Initiative

Principal Investigators:

Rick Bevins, Ph.D.

Dan Hoyt, Ph.D.

Description: To strengthen the network of investigators and practitioners conducting research on critical minority health issues in Nebraska and the nation, NTSBRDF funds helped finance a cross-institutional retreat attended by 58 people representing UNL, UNMC, UNO, State of Nebraska, and public schools and other health agencies. The MHDI also sponsored visiting speakers who were brought to campus to consult with UNL faculty and to provide a public presentation on minority health topics. Support was provided for outreach, research analysis and research coordination on minority health disparity projects. Funding was also provided to train students from underrepresented groups in the research of minority health disparities.

Project Title: Understanding How Stress Process Physiology Affects Health

Principal Investigator: Jacob Cheadle, Ph.D.

Description: Seed funding was provided to examine the biosocial pathways linking discrimination and health. The goal is to use genotyping to construct novel measures of stress reactivity from genetic material collected as part of a pilot study. Results will allow researchers to begin to characterize the physiological pathways by which discrimination harms health and advance understanding of why some people get sick in response to discrimination and others do not.

Project Title: Stress Exposure, Sleep, and Minority Health Disparities

Principal Investigator: Timothy Nelson, Ph.D., Associate Professor of Psychology

Description: Seed funding was provided to explore the role of sleep as a potential link between stress and disparities in stress-related illnesses. An intensive short-term longitudinal study will collect objective measures of sleep and daily reports of stress from a sample of 40 parents and their children across two weeks. This data will be used to provide preliminary support for methods examining numerous multilevel processes (e.g., processes involving multiple biological, behavioral, and social factors; occurring across time and between parent-child dyads).

Project Title: Family Dynamics, Identity, and Psychological Well-being in Multiethnic-racial individuals

Principal Investigator: Jordan Soliz, Ph.D.

Description: Seed funding was provided to study the role of family in creating secure ethnic-racial identity and psychological well-being among multiethnic-racial individuals. In-depth interviews of 25-30 multiethnic-racial young adults will be conducted to identify salient family processes associated with ethnic-racial identity development. Study 1 data will be supplemented by parent surveys. Study 2 will involve a large-sample survey that allows the researchers to test path models that link parent behaviors, family solidarity, ethnic/racial identity, and psychological well-being.

CREIGHTON UNIVERSITY
Nebraska Tobacco Settlement
Biomedical Research Development Fund (NTSBRDF)

Year 14: July 1, 2014-June 30, 2015
Progress Report

Executive Summary

The Creighton University investment of the Nebraska Tobacco Settlement Biomedical Research Development Fund dollars is concentrated in two areas:

- Research Program and Infrastructure Development
- Minority Health Research Grants.

With the support of the NTSBRDF, Creighton University continues to address some of the world's most complex and perplexing health care challenges. Research investigators play a fundamental role in enhancing the quality of life for individuals and in expanding the research community in Nebraska and the region. The primary purpose and use of the NTSBRDF program at Creighton University is to increase funding from federal health agencies and institutes. In 2014-2015, the collective efforts of the research investigators at Creighton University produced significant results. Creighton University received approximately \$26 million in extramural funding. Investigators were awarded federal grants from the Department of Defense, National Institutes of Health, National Science Foundation, and Centers for Disease Control and Prevention, as well as many other non-federal grants from corporations and foundations. The university and its investigators look forward to continuing to use NTSBRDF funds as a springboard to benefit the citizens of Nebraska and to add to research and health care knowledge everywhere.

Research Program and Infrastructure Development

A total of \$1,590,182 was invested in research program and infrastructure development in 2014-2015 in a wide variety of topics, including the Role of Autophagy Genes in Auditory Hair Cell Survival, Evaluation of Platelet Function and Arterial Stiffness with E-Cigarettes, Vitamin D Endocrine System in Barrett's Esophageal Carcinogenesis, Identification and Optimization of Novel Anti-Tuberculosis Agents, and Mechanisms Underlying Insulin Resistance in Morbidly Obese Patients. Moreover, the Research Program and Infrastructure Development portion of the NTSBRDF supported biomedical research by providing bridge funding, support for research equipment, core facility funding for research faculty, and employing a Biostatistician.

Funded Investigators

Investigator: Weston, Michael, PhD

Position Title & Department: Assistant Professor, School of Dentistry, Department of Oral Biology

Project Title: MIRNA and RNAI Effects on Hair Cell Transdifferentiation by ATOH1

External Funding:

Current Year Funding Total: \$75,000

Funding Sources: NE-DHHS

Investigator: Kirk Beisel, PhD

Position Title & Department: Professor, School of Medicine, Department of Biomedical Sciences

Project Title: Role of Autophagy Genes in Auditory Hair Cell Survival

External Funding:

Current Year Funding Total: \$146,239

Funding Sources: DHHS/NIH/NIGMS, NE-DHHS

Investigator: Songcang Chen, PhD

Position Title & Department: Research Assistant Professor, School of Medicine, Department of Biomedical Sciences

Project Title: Role of FOXO1 in Vitamin D Deficiency-Induced Insulin Resistance

External Funding:

Current Year Funding Total: \$60,000

Funding Sources: NE-DHHS

Investigator: Amy Arouni, MD

Position Title & Department: Associate Professor, School of Medicine, Department of Medicine

Project Title: Evaluation of Platelet Function and Arterial Stiffness with E-Cigarettes

External Funding:

Current Year Funding Total: \$143,040

Funding Sources: Janssen Scientific Affairs, L.L.C., Boehringer Ingelheim Pharmaceuticals, Inc., NE-DHHS

Investigator: Janee Gelineau-van Waes, PhD

Position Title & Department: Associate Professor, School of Medicine, Department of Pharmacology

Project Title: MIR-574-5P Balances the Neural Progenitor Sphingolipid-APP Axis of Good and Evil

External Funding:

Current Year Funding Total: \$75,000

Funding Sources: NE-DHHS

Investigator: Sumeet Mittal, MD

Position Title & Department: Associate Professor, School of Medicine, Department of Surgery

Project Title: Vitamin D Endocrine System in Barrett's Esophageal Carcinogenesis

External Funding:

Current Year Funding Total: \$60,000

Funding Sources: NE-DHHS

Investigator: Kalyana Nandipati, MD

Position Title & Department: Assistant Professor, School of Medicine, Department of Surgery

Project Title: Mechanisms Underlying Insulin Resistance in Morbidly Obese Patients

External Funding:

Current Year Funding Total: \$110,000

Funding Sources: NE-DHHS

Investigator: Larry Siref, MD

Position Title & Department: Associate Professor, School of Medicine, Department of Surgery

Project Title: Triggering Receptors Expressed on Myeloid Cells and Bladder Cancer

External Funding:

Current Year Funding Total: \$60,000

Funding Sources: NE-DHHS

Investigator: Jeffrey North, PhD

Position Title & Department: Assistant Professor, School of Pharmacy and Health Professions, Department of Pharmacy Sciences

Project Title: Identification and Optimization of Novel Anti-Tuberculosis Agents

External Funding:

Current Year Funding Total: \$80,608

Funding Sources: American Association of Colleges of Pharmacy, NE-DHHS

Investigator: Jason Bartz, PhD

Position Title & Department: Associate Dean for Faculty Affairs & Professor, School of Medicine, Department of Microbiology and Immunology

Project Title: Prion Disease Postdoctoral Support

External Funding:

Current Year Funding Total: \$358,094

Funding Sources: DHHS/NIH/NINDS, NE-DHHS

Investigator: Thomas Murray, PhD

Position Title & Department: Associate Vice Provost for Research and Scholarship & Professor and Chair, School of Medicine, Department of Pharmacology

Project Title: Neuropharmacology Postdoctoral Support

External Funding:

Current Year Funding Total: \$410,736

Funding Sources: DHHS/NIH/NINDS, DHHS/NIH/NIDA, NE-DHHS

Minority Health Research Grants

Introduction: Creighton's core values include the inalienable worth of each individual and appreciation of ethnic and cultural diversity coupled with service to others. As such, the NTSBRDF supports Creighton University's commitment to improving the health of racial and ethnic minorities. A total of \$193,913 was awarded in 2014-2015 for minority health research.

Funded Investigators

Investigator: Sade Kosoko-Lasaki, MD

Position Title & Department: Associate Vice Provost – Health Science Multicultural and Community Affairs

Expertise: Center for Promoting Health and Health Equality (CPHHE)

External Funding:

Current Year Funding Total: \$697,339

Funding Sources: DHHS/CDC, Catholic Health Initiatives, NE-DHHS

BOYS TOWN NATIONAL RESEARCH HOSPITAL
Nebraska Tobacco Settlement
Biomedical Research Development Fund (NTSBRDF)

Year 14: July 1, 2014 – June 30, 2015
Progress Report

Executive Summary

During the Fourteenth year of the NTSBRDF program, the Boys Town National Research Hospital (BTRNH) continued to pursue strategic objectives to improve the health of Nebraskans through biomedical research, increase NIH funding and enhance collaboration among Nebraska's major biomedical research institutions.

During Year 14, we continued support of several researchers recruited in earlier years. As noted in last year's Executive Summary, funding of our Center of Biomedical Research Excellence (COBRE) application to create a Center for Perception and Communication in Children has eliminated the need for additional support for several laboratories described in recent annual reports. Instead we funded new initiatives in laboratories within our Center for Sensory Neuroscience in preparation for a second COBRE application, to be submitted in collaboration with UNMC.

Our major new initiative during Year 14 was installation of a Siemens 3T MRI in a new laboratory space designed to be the focal point of the Center for Neurobehavioral Research. We continued to provide startup funds for Dr. Kayla Pope as interim director of the new center and recruited a laboratory group from NIMH who will join the new center in Year 15.

In the area of Minority Health, we continued to support a program on perception of speech in difficult listening environments in Spanish-English bilinguals. This work received NIH support as a project within the new Center for Perception and Communication in Children, but we have continued supplemental NTSBRDF funding to provide partial support for a bilingual postdoctoral fellow.

Strategic Faculty Recruitment and Retention

Introduction: Most entries in this category represent multiple-year start-up packages for new investigators. As they obtain external support and become fully independent, they drop off the list making way for new people. We had a small expenditure for Dr. Shuman He, an electrophysiologist who joined our program in June, 2014. The bulk of her startup expenses occurred after July 1st and will be included in the report for Year 15. We also support established laboratories to allow them to maintain active research programs despite short-term lapses in funding. The Current Funding Total reflects the current cycle of all grants where the individual was designated as PI.

Investigator: Sophie Ambrose, PhD

Position Title & Department: Director of the Communication Development Laboratory, Lied Learning and Technology Center.

Expertise: Relation between gesture and language development in children with hearing loss.

External Funding:

Current Funding Total: \$438,000

Funding Sources: NIH/NIDCD

Investigator: Kayla Pope, JD, MD

Position Title & Department: Director of Neurobehavioral Research.

Expertise: Pediatric psychiatry, fMRI imaging of children with behavioral disorders.

External Funding:

Pending

Investigator: Monita Chatterjee, PhD

Position Title & Department: Director of the Auditory Prostheses and Perception Laboratory, Lied Learning and Technology Center.

Expertise: Use of behavioral methods to compare the perception of subjects with cochlear implants to the perception of subjects with normal acoustic hearing.

External Funding:

Current Funding Total: \$1,777,371

Funding Sources: NIH/NIDCD

Investigator: Barbara Morley, PhD

Position Title & Department: Director of the Auditory Neurochemistry Laboratory, Center for Sensory Neuroscience.

Expertise: Use of molecular methods to study the development of neurotransmitters in the auditory brainstem nuclei.

External Funding:

Current Funding Total: \$130,169

Funding Sources: NIH/NIDCD

Investigator: Shuman He, PhD

Position Title & Department: Director of the Human Auditory Electrophysiology Laboratory, Center for Hearing Research.

Expertise: Use of auditory evoked potentials in the assessment of patients with auditory brainstem implants.

External Funding:

Current Funding Total: \$292,960

Funding Sources: NIH/NIDCD/NIGMS

Investigator: Richard Tempero, MD, PhD

Position Title & Department: Director of the Lymphatic Biology Laboratory, Center for Sensory Neuroscience.

Expertise: Roles of lymphangiogenesis in inflammation and cancer; regulation of cellular cues that promote or inhibit formation of new lymphatic vessels.

External Funding:

Current Funding Total: \$1,526,081

Funding Sources: NIH/NEI

Investigator: Edward Walsh, PhD

Position Title & Department: Director, Developmental Auditory Physiology Laboratory, Center for Sensory Neuroscience.

Expertise: Physiological measurement of peripheral and central auditory function.

External Funding:

Current Funding Total: \$1,520,061

Funding Sources: NIH/NIGMS, ONR

Investigator: Yunxia Lundberg, PhD

Position Title & Department: Coordinator of the Vestibular Neurogenetics Laboratory, Center for Sensory Neuroscience.

Expertise: Expression of genes and characterization of proteins in the vestibular sense organ, genetics of benign paroxysmal positional vertigo (BPPV).

External Funding:

Pending

Investigator: Marisa Zallocchi, PhD

Position Title & Department: Director of the Functional Genetics Laboratory, Center for Sensory Neuroscience.

Expertise: Biochemical mechanisms of Usher pathobiology in photoreceptors and cochlear hair-cells; use of zebrafish model to study gene expression and function.

External Funding:

Pending

Research Program and Infrastructure Development

Introduction: Some entries in this category are identical to those for the preceding year. We have provided updates in the descriptions of the projects.

Project Title: Animal Care Facility Core

Principal Investigator: JoAnn McGee, PhD

Amount of Funding: \$48,855

Description of Goals and Accomplishments: Core support is necessary to maintain adequate staffing levels and uniform *per deim* charges in the Animal Care Facility in spite of fluctuating levels in the use of the facility.

Project Title: Electron Microscopy Core

Principal Investigator: Walt Jesteadt, PhD

Amount of Funding: \$7,860

Description of Goals and Accomplishments: BTNRH relies on electron microscopy core services provided by UNMC, but rates are significantly higher for non-UNMC users than for those at UNMC. This fund covers the difference in costs, giving BTNRH users the equivalent of in-house UNMC rates. This is far less expensive than developing our own core facilities and will be expanded to cover other core services.

Project Title: Sensory Neuroscience Center Core Support

Principal Investigator: Dominic Cosgrove, PhD

Amount of Funding: \$317,857

Description of Goals and Accomplishments: Funds were allocated for supplemental support of programs and core functions in the Center for Sensory Neuroscience, including the Vestibular Neurogenetics, Cell Signaling and Gene Marker Laboratories and the Genotyping Core.

Project Title: New Projects Fund

Principal Investigator: Michael Gorga, PhD

Amount of Funding: \$6,395

Description of Goals and Accomplishments: A central fund was continued in Year 14 to provide startup funds for pilot projects proposed by current members of the BTNRH research and clinical staff. This money was used to provide honoraria for research subjects and to cover minimal supply costs.

Project Title: Recruitment Fund

Principal Investigator: Walt Jesteadt, PhD

Amount of Funding: \$6,996

Description of Goals and Accomplishments: A recruitment fund allows us to separate the costs of advertising, moving and interviewing candidates from the costs of individual recruitment packages. The initial costs of recruitment occur well in advance of the start date for a position. Moving costs vary and are generally handled separately from start-up funds. We recruited three new laboratory directors in Year 14 who started in Years 14 and 15: Drs. Shuman He, Lori Leibold and Soyoun Cho.

Project Title: Postdoctoral Training

Principal Investigator: Douglas Keefe, PhD

Amount of Funding: \$9,927

Description of Goals and Accomplishments: The longest running NIH grant at BTNRH provides support for a postdoctoral training program. It was renewed during Year 14 for training grant years 36 through 40. The postdoctoral fellows contribute in many ways to the success of the research program as a whole. The grant does not support the cost of recruiting postdoctoral fellows and provides minimal support for travel to national meetings. We supplement stipends to make competitive offers. We have therefore created a fund to support those costs.

Minority Health Research Grants

Introduction. In Year 14 we have continued two projects reported in previous years. The first is key to all of our efforts to expand research in areas related to minority health. The second is a study of the problems associated with learning a second language.

Project Title: Minority Recruitment

Investigator: Michael Gorga, PhD

Amount of Funding: \$16,593

Description of Goals and Accomplishments: The Minority Recruitment project has continued to be successful in greatly increasing the representation of minority subjects in our NIH-funded research studies. The funds have been used to provide support for translation of consent forms and other documents, interpreters to aid in the consent process, and consultants in the minority communities. The value of this effort was increased by the presence of an NIH-funded Human Subjects Research Core at BTNRH that facilitates recruitment of subjects for all NIH-funded clinical studies. By attaching the Minority Recruitment effort to the existing core function, we have been able to spread the benefit of a proactive minority recruitment program across many laboratories. Typical minority participation in our research studies is well above the representation of minorities in our community.

Project Title: Spanish-English Bilinguals

Investigator: Kanae Nishi, PhD

Amount of Funding: \$55,919

Description of Goals and Accomplishments: Spanish learners of English (L2) rely heavily on contextual information to process speech presented in noise and their reliance on context varies widely among individuals even for listeners with similar English proficiency. We have expanded the project to include children as well as adults and to focus on hearing-aid issues. Processing of acoustic cues requires preservation of those cues in the hearing-aid output. This is particularly important for children learning the second language. This project was included in the COBRE application and received outstanding reviews. NTSBRDF funds are providing partial support for Dr. Paula Garcia, a postdoctoral fellow who is herself a Spanish learner of English. Dr. Garcia's background in the use of cortical evoked potentials has allowed us to expand the scope of the research program.